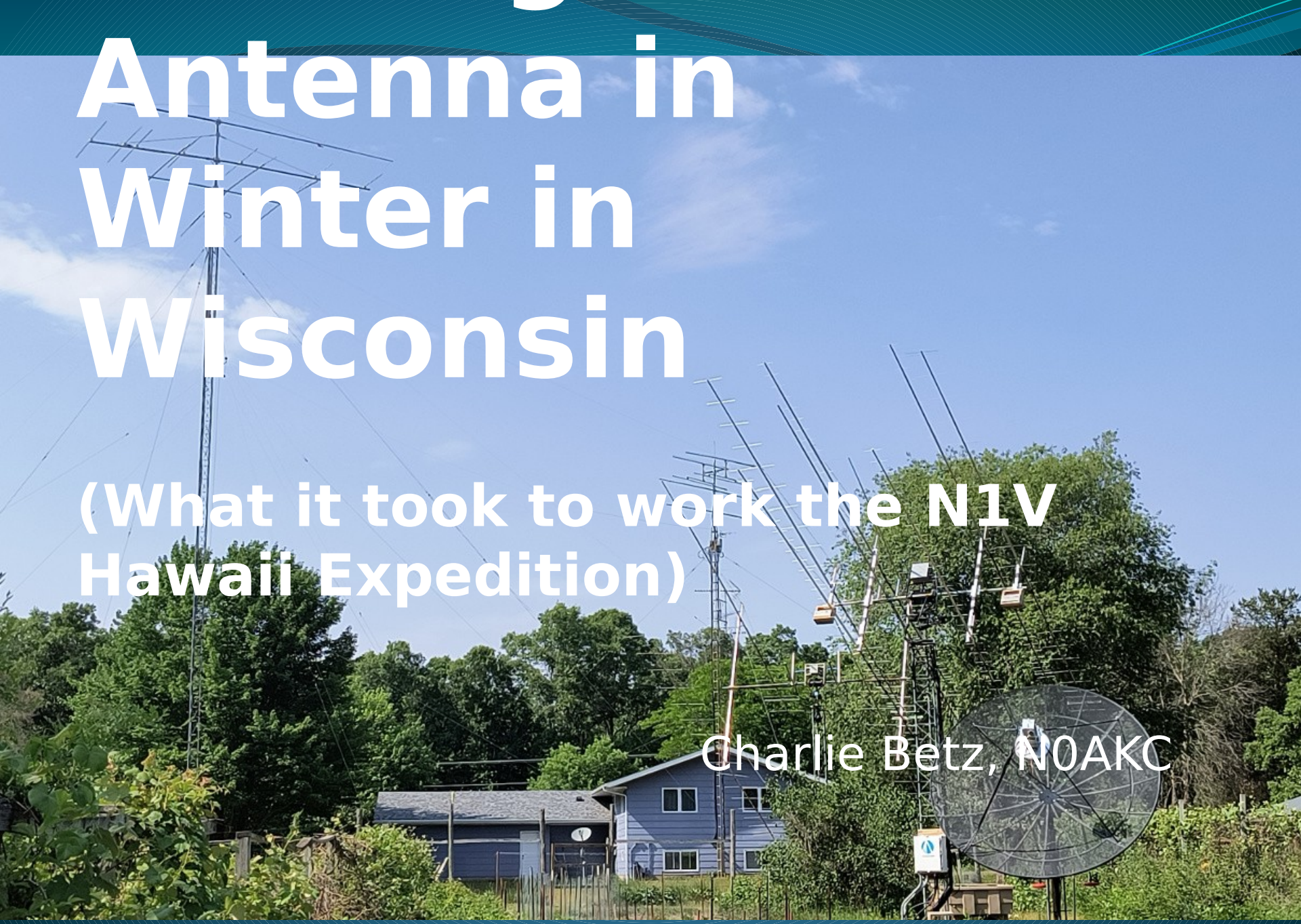
Antenna in Winter in Wisconsin

(What it took to work the N1V Hawaii Expedition)



Charlie Betz, N0AKC

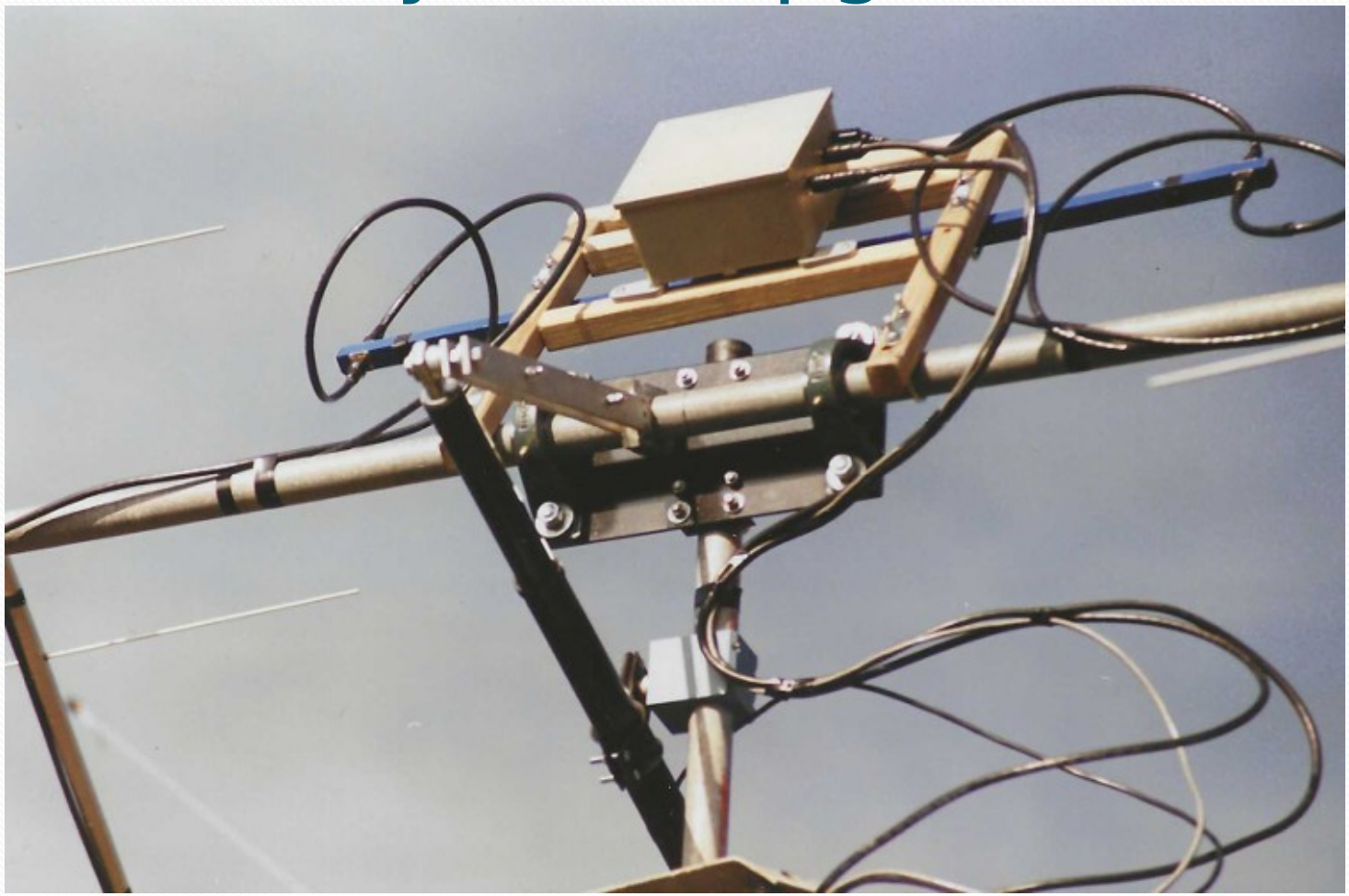
This Presentation

- A Brief History of EME at N0AKC
- Re-purposing an old TVRO dish for 23cm
- Working the N1V expedition
- 13cm and Beyond

First 2M EME Station (1993)

- 4 x 10 element K5GW antennas.
- LNA at array
- Yaesu G-500 elev. Rotor
- Ham 4 for Azimuth
- ~100 feet LDF-5 on TX
- ~100+ feet RG8 on RX
- Kenwood TS-520S
- MMT Transverter

Elevation System Upgrade (1994)



Elevation System Controller

New 2M Array (1996)

222/432 Array (2019)

EME Activity at N0AKC

- 2M WAS (#147) achieved in 2001
- 222 WAS (#16) achieved in 2022
- Abandoned 10’ (3M) TVRO dish looking for something to do

N0AKC EME Antennas

Getting stated on 23cm EME

- Started getting prodded by N9HF in late spring of 2022 to make the jump to a new band.
- He'd started playing on the band with an old dish he had and an OK1DFC feed he'd built. System had issues and wasn't playing well.
- Dave inquired last June if I knew where he could find a used 10 foot TVRO dish for a reasonable price that he could haul back to Florida. It had to break down for transport.


N9HF

Fall 2022

- N1AV and W2HRO announce plans to activate Hawaii on 902 & 1296 EME 3/5 – 3/10, 2023.
- N9HF says “You have to get on and work Hawaii”
- I started asking N1AV questions and Jay started pushing me to get on as well.

January 9, 2023

Escalating the Project

- We get sunny weather and a bit of a warm up in early February – time to get to work!

- It will take a lot of work, but maybe, just maybe, I can get the dish up and running by March 5.

Hurdles to Overcome

- Need to convert to full Az/El to track moon
- My dish was mounted on a 3” pipe; SPID rotator mounts on a 2.5” mast.
- Dish is 175 feet from the shack
- We had 16” of snow on the ground

Conditions in February

Original TVRO Dish

February 8, 2023

Only piece of the original polar mount that was kept.

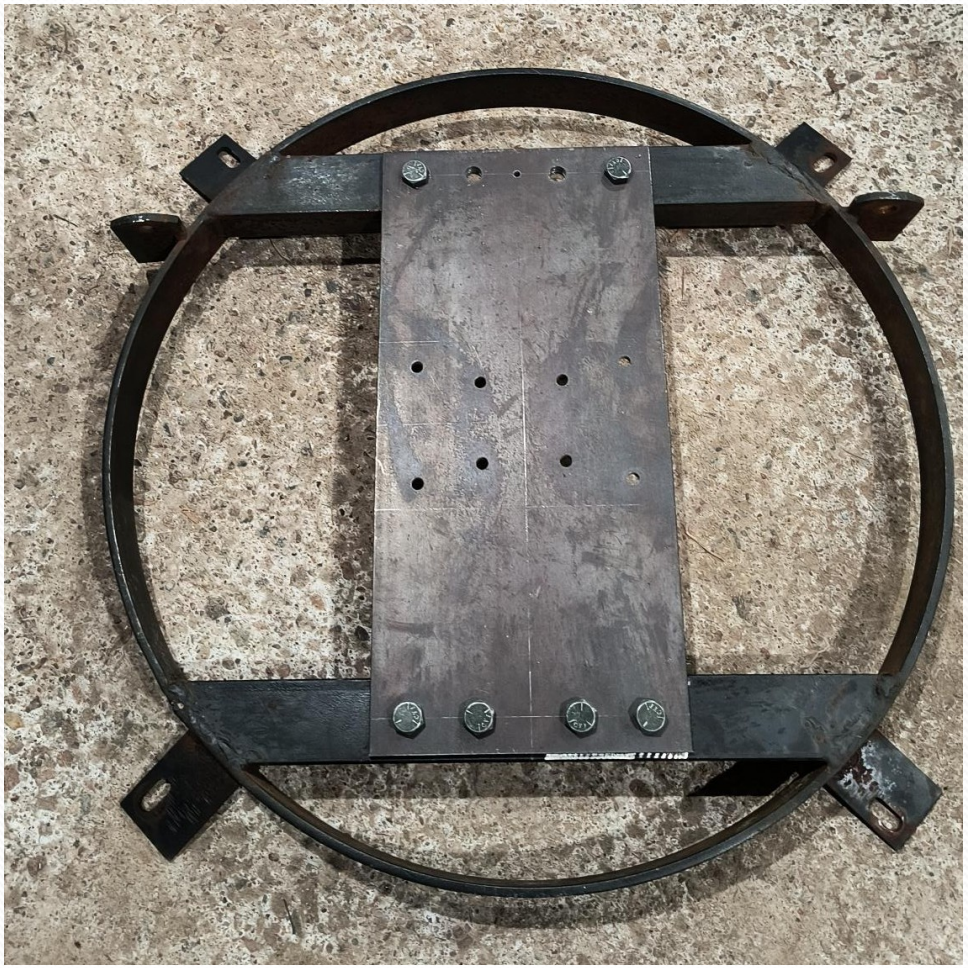
February 11, 2023

Adaptor for mounting SPID Az/El rotor

Constructed from 3” square tube with 2.5” pipe welded on top

February 10, 2023

Modification of mounting ring for affixing it to Az/El rotor



February 12, 2023

February 13, 2023

Ring Mount Installed

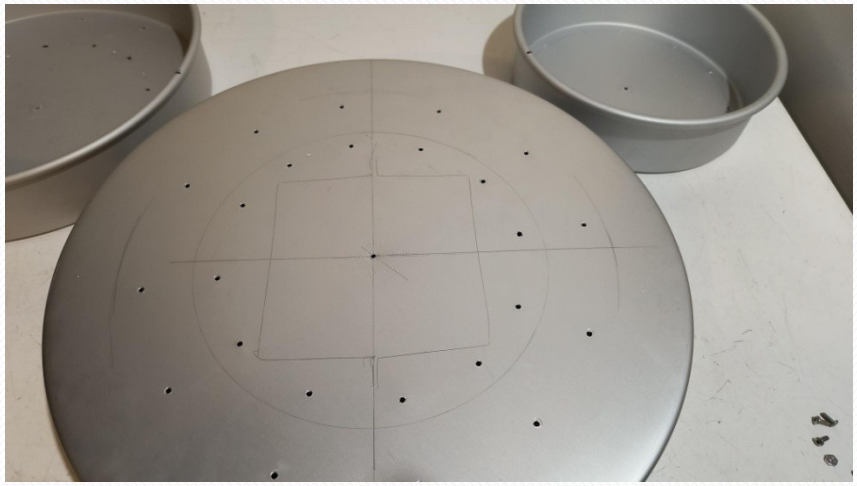
February 18, 2023

Dish reattached to mount

February 25, 2023

23cm feed installed

Cake Pan Choke Pieces



February 28, 2023

System essentially done. Need to get cables routed around the dish and down the pole.

March 5, 2023

First night on the air!

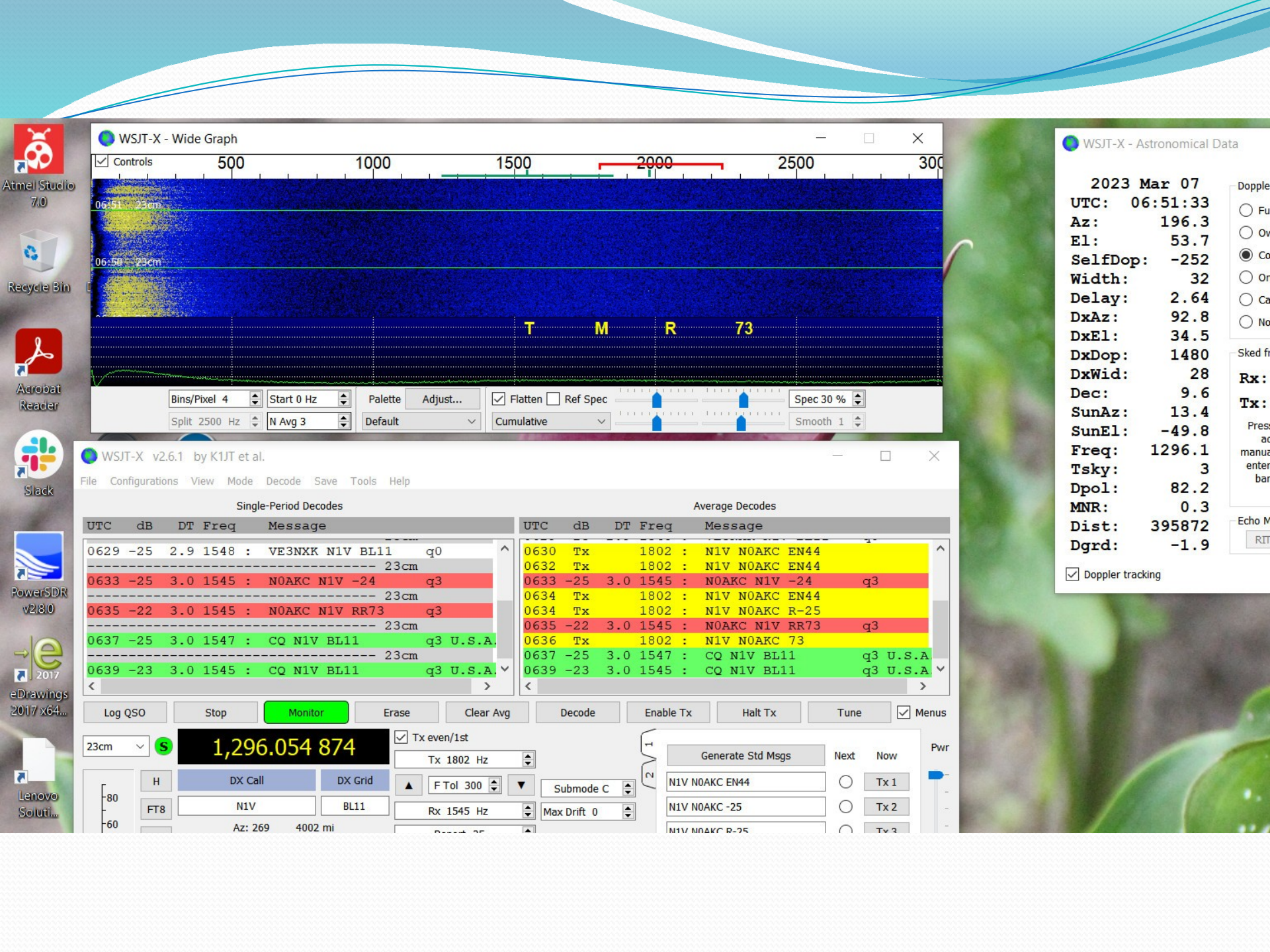
Stations Worked:

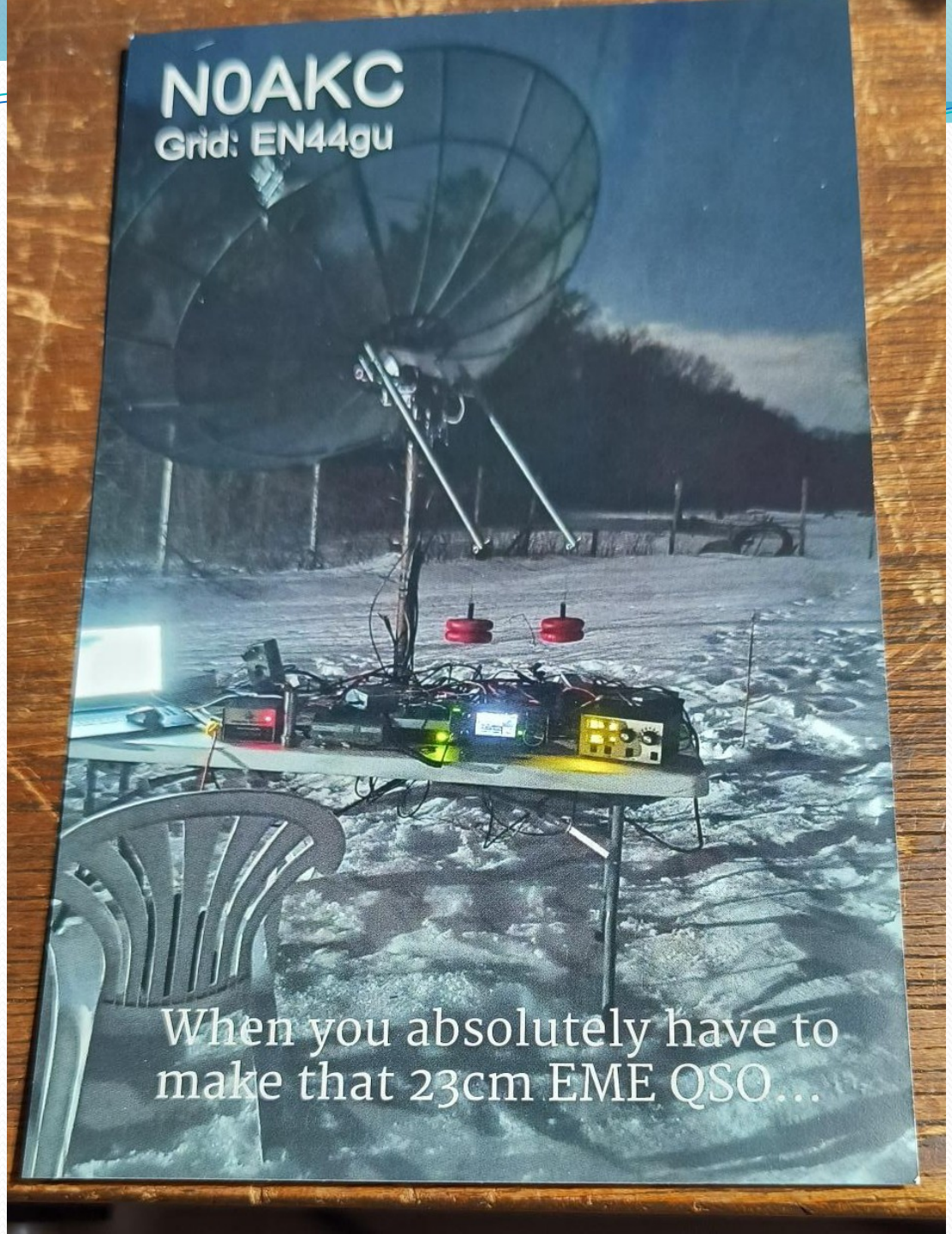
KD5FZX
W5AFY
K5DOG
KA6U (at K5QE)
W7JW
N0CTR
KA1GT
K8ZR
W6TCP

March 6/7, 2023

Stations Worked:

SM6CKU
KB2SA
W5GLD
DK3WG
W5ULA
VE6TA
IK3COJ
N1V

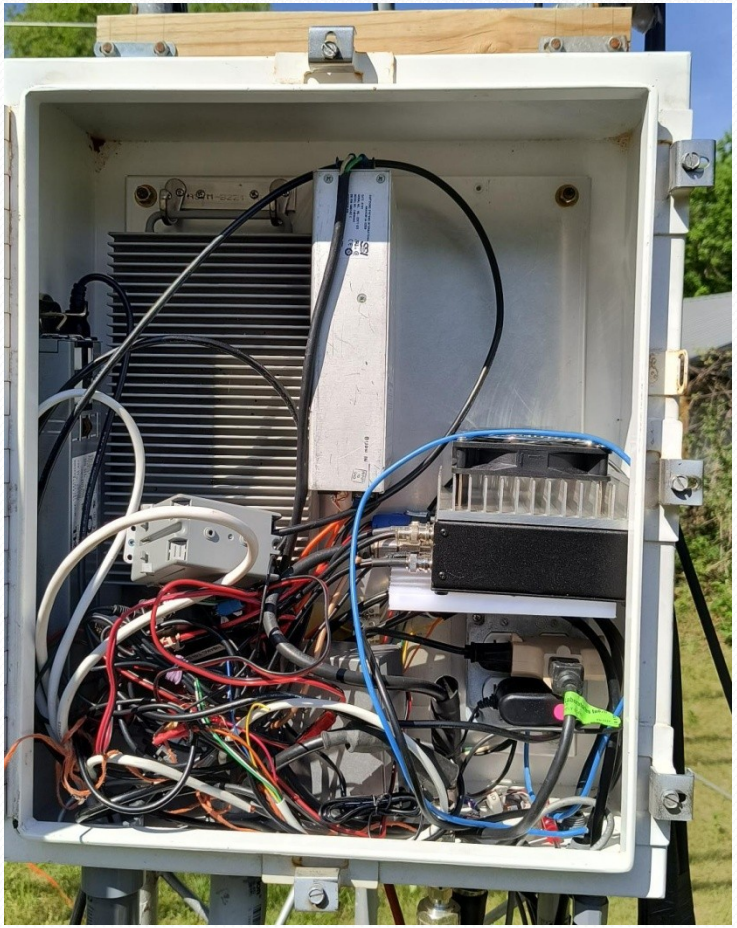

WSJT-X - Wide Graph
Controls
500
1000
1500
2000
2500
T M R 73
Bins/Pixel 4
Start 0 Hz
Palette
Adjust...
Flatten
Ref Spec
Spec 30 %
Split 2500 Hz
N Avg 3
Default
Cumulative
Smooth 1
WSJT-X - Astronomical Data
2023 Mar 07
UTC: 06:51:33
Az: 196.3
El: 53.7
SelfDop: -252
Width: 32
Delay: 2.64
DxAz: 92.8
DxEl: 34.5
DxDop: 1480
DxWid: 28
Dec: 9.6
SunAz: 13.4
SunEl: -49.8
Freq: 1296.1
Tsky: 3
Dpol: 82.2
MNR: 0.3
Dist: 395872
Dgrd: -1.9
Doppler tracking
WSJT-X v2.6.1 by K1JT et al.
File Configurations View Mode Decode Save Tools Help
Single-Period Decodes
Average Decodes
UTC dB DT Freq Message
0629 -25 2.9 1548 : VE3NXK N1V BL11 q0
23cm
0633 -25 3.0 1545 : N0AKC N1V -24 q3
0635 -22 3.0 1545 : N0AKC N1V RR73 q3
0637 -25 3.0 1547 : CQ N1V BL11 q3 U.S.A.
0639 -23 3.0 1545 : CQ N1V BL11 q3 U.S.A
0630 Tx 1802 : N1V N0AKC EN44
0632 Tx 1802 : N1V N0AKC EN44
0634 Tx 1802 : N1V N0AKC EN44
0634 Tx 1802 : N1V N0AKC R-25
0636 Tx 1802 : N1V N0AKC 73
Log QSO
Stop
Monitor
Erase
Clear Avg
Decode
Enable Tx
Halt Tx
Tune
Menus
23cm
1,296.054 874
Tx even/1st
Tx 1802 Hz
F Tol 300
Submode C
Rx 1545 Hz
Max Drift 0
Generate Std Msgs
Next
Now
N1V N0AKC EN44
N1V N0AKC -25
Tx 1
Tx 2
Pwr
H
DX Call
DX Grid
FT8
N1V
BL11
Az: 269
4002 mi
Atmel Studio 7.0
Recycle Bin
Acrobat Reader
Slack
PowerSDR v2.8.0
eDrawings 2017 x64...
Lenovo Soluti...


N0AKC
Grid: EN44gu
When you absolutely have to
make that 23cm EME QSO…

Obstructions Looking East

Utility Box on 222/432 Tower

Remote Installation of Equipment



N0AKC 23cm Statistics

- **2001 – 2022:**
  - **States Worked: 6**
  - **VUCC Grids Confirmed: 20**
  - **DXCC Countries: 1**

- **As of July 7, 2024:**
  - **States Worked: 19**
  - **VUCC Grids Confirmed: 86**
  - **DXCC Countries: 24**
  - **EME Initial QSOs: 95**

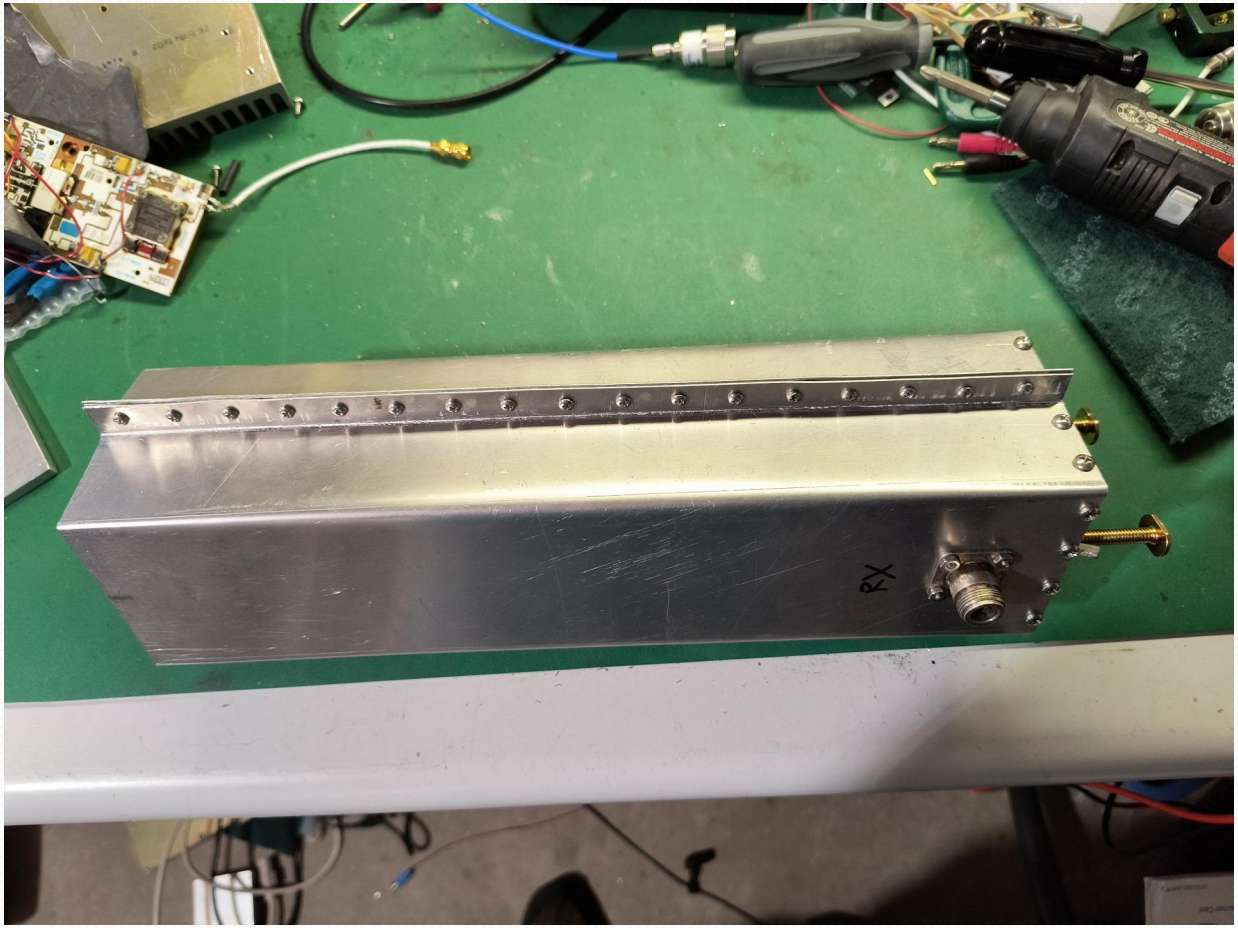
What’s Next

- N1AV and W2HRO announce they are going back to HI in March 2024 taking 902, 1296, 2304 & 10 GHz.

- Time to add 2.3 & 10 GHz to the EME lineup!

- Unfortunately the 10 GHz hurdle proved too hard to climb in the short time frame.

Septum Feed for 2.3 GHz



February 2024

February 2024

2.3 GHz Results

- Unfortunately I was not able to work N1V on 2.3 GHz, but did work them on 902 MHz.
- The 2.3 GHz setup has proven to work very well as 13 EU stations have been worked to date
- Worked OE9ERC on 2.3 GHz SSB!

Going Forward

- 3.4 GHz feed is currently being built with hopes of being on the air for the ARRL Microwave EME weekends.
- Still working on 10GHz; also hoping to have a low power station on the air for the EME contest.
- I currently have no equipment for the 5.7 GHz band so not sure if I'll venture there or not.

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